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THE SACRAL OR ISO-CALLED "MONGOLIAN" PIGMENT SPOTS OF EARLIEST INFANCY AND CHILDHOOD, WITH ESPECIAL REFERENCE TO THEIR OCCURRENCE IN THE AMERICAN NEGRO

By JOSEPH BRENNEMANN

Whoever has carefully examined recently born children of the darker races, notably the Mongolian and the African, has been impressed by the nearly constant presence in the sacral and sacro-gluteal regions of irregular areas of bluish pigmentation that contrast rather strongly with the general body color. For centuries Japanese physicians and writers have discussed and striven to interpret the occurrence of such pigmentation in children of their race, where it forms a peculiarly striking picture. Since Baelz first introduced this subject to the Western scientific world, about twenty years ago, a great deal has appeared in German, French, and Japanese literature about this peculiar phenomenon that is of interest from many points of view. In this discussion American anthropologists and physicians have taken a relatively insignificant part. This seems all the more strange because we have so great a wealth of easily accessible material at our very doors. Because of the inadequate treatment at the hands of our anthropologists of the phenomenon in question, and because of the fact that so few medical men, in my experience, know even of its occurrence, to say nothing of its meaning and distribution, it has seemed to me appropriate that someone should assemble the array of observations that have been made in the last few years and present them in the hope that they will prove of interest to both the anthropologist and the clinician. I will review briefly the literature of this subject, especially that of the last few years, and will record my own observations on children of the American negro.

Our earliest observations come from Japan. The well-marked, deeply pigmented blue spot of the Japanese baby forms a striking

contrast with the general body color. It may well be described as a type to which those of all other races may be compared. In the sacral, or sacro-gluteal, region of nearly all recently born Japanese children are found one or more well-defined, distinctly blue or grayish-blue spots varying in size from that of a small coin to that of an expanded hand. They may extend over both buttocks, or into the lumbar region, and isolated spots of identical nature may be found over the back, or shoulders, or extensor surfaces of the extremities — almost never on the ventral and flexor surfaces. They are not raised above the surrounding skin. They are not influenced by pressure or even made plainer by contrast with a blanched surface. In nearly all cases this pigmentation is present at birth and during the latter months of intrauterine life. It may, however, appear weeks and even months after birth. The blue color deepens for a time, then gradually fades away, leaving no trace after a few years. It rarely persists to the sixth or seventh year, and only very exceptionally to adult life.

In Chinese and other Mongolian peoples identical spots are found with the same characteristics, except that their color is reported as more bluish-gray than blue. Chemin found it in 89 percent of Chinese children during the first year, in 71 percent during the second year, and in 19 percent from the third to the eighth year. Matignon found it in 97 to 98 percent of pure Chinese up to two and a half years of age, in 10 to 12 percent after four years, and only rarely after the fifth year.

In 1885 Baelz, a German physician who held a clinic in Tokio for many years and married a Japanese woman, called the attention of European scientific men to this characteristic of the Japanese race. His observations extend to other Mongolian peoples and he considered it a distinct racial characteristic. It was he who introduced the term *Mongolen Fleck* into German literature, where it is still used extensively. When later he found similar spots in two Indian children in northern Vancouver, British Columbia, he considered the occurrence to furnish an argument in favor of Mongolian descent of the American Indian. Baelz made careful microscopical examinations of these spots in Japanese children and described large pigment cells deep in the corium that were peculiar to them. A series of articles appeared from this author up to 1902.

More than a hundred years before this time Saabye, a Danish missionary, noted these spots in new-born Eskimo in Greenland. His notes were not published until 1816.

In 1849 Eschricht published his accurate observations on Eskimo children.

In 1895 Grimm treated the subject from a morphological standpoint so exhaustively that little has been added to it (Adachi). He examined, macroscopically and microscopically these areas of pigmentation in Japanese children and confirmed the findings of Baelz. He found the characteristic pigment cells deep in the corium as early as the fourth month of fetal life and states that the spots begin to appear at this time.

It remained, however for a Japanese, Buntaro Adachi, working in the laboratory of the German anatomist Schwalbe, in Strassburg, to place the whole subject on a firm scientific basis. In 1903 he published the results of his exhaustive study of pigmentation of the skin in man and monkeys. He had long believed that these pigment spots were not distinctly Mongolian as taught by Baelz, and he started out to look for the causal cells in the skin of white children. His findings led him into a study of pigmentation in general in man and monkeys, and to a special study of the morphology of the "Mongolian" spot. He examined sections of the skin, from a great many different places in each of seventy-six Europeans, including seven embryos, and of twenty-six monkeys of different kinds. In both man and monkeys he found pigment in the epidermis and corium independent of one another, more or less in the same proportion, and very variable in amount in different races and individuals.

It was the pigment found in the corium that was especially significant. This Adachi found in two distinct layers of pigment-bearing cells, as follows:

1. A faint layer of small cells high up in the corium, close to but entirely separate from the well-known deeply lying epidermal pigment. These were found widely distributed but of little importance.

2. A deeper layer made up of much larger spindle-shaped or stellate cells, forming in sections a distinct horizontal band deep in

the corium. In monkeys these are found widely distributed, and their amount is usually inversely proportional to that of the epidermal pigment. If both epidermal and deep corium pigment are scant, the general color of the monkey is pale, or flesh colored, as in the lemur. If the former is abundant and the latter scant or absent, the color is brown as in the chimpanzee. If the opposite condition prevails, *i. e.*, little epidermal pigment and much deep corium pigment, we get the well-known shimmering blue color of certain monkeys like cynocephalus, macacus, etc. If both pigments are very abundant, we have the dirty bluish-brown color of the orang-outang.

In man these deep corium cells are found only in limited areas, usually in the sacro-lumbo-gluteal region, where, if sufficiently abundant to show through the overlying layers, they appear to the eye as our blue pigment spots. These are the same cells that Baelz and Grimm had described many years before. In both man and monkeys these deep-lying dark pigments appear blue on the surface in accordance with the same law that makes black carbon appear blue in the tattoo mark. In fact many of these spots resemble nothing else so much as they do tattoo marks.

Adachi's classical work, so far as it pertains to the human being, is limited to the white European. Yet in 10 out of 24 cadavers of white children up to two and a quarter years of age he found these characteristic large pigment cells deep in the corium, always in the sacral region only, except in 4 cases where they were found in the gluteal region also. In the remaining 52 cases he found them only twice and with some difficulty. In none of 7 embryos did he find them, and only twice in 7 newly-born children. The maximum occurrence was from the sixth month to the third year rather than at birth. It will be remembered that Grimm found them in the Japanese fetus at the fourth month. In none of these cases could the presence of a blue spot be demonstrated; however, it would be difficult to do so on a cadaver with the usual post-mortem discoloration. Adachi reasoned that this evanescent pigmentation is a normal human characteristic, found in different degrees in all races. The last few years have amply shown how well grounded are his findings and also the theories he based on them.

Observations have come from all sides. How universal this peculiar phenomenon is, that only a few years ago was considered a sign of Mongolian descent, is shown by an enumeration of the various races and peoples from whom definite reports have been obtained. I have spoken of the Japanese and the Chinese. In sections of the latter Birkner (1904) demonstrated the causal deep corium cells. Among Koreans these spots were reported by Baelz and Sekiba; Anamites by Chemin; Malayans by Kohlbrugge and Baelz; Javanese by Kohlbrugge, ten Kate, Deniker, and Baumgarten; Indonesians by Kohlbrugge and Riedel; among the inhabitants of the Celebes and other islands of the Pacific by Riedel; Igorrotes of the Philippine islands, by R. M.; Samoans by von Buelow; Hawaiians by Okabe, ten Kate, and Baelz; among the Eskimo by Hansen, Saabye, and Eschricht.

Among Indians they were reported by Baelz, who found them in two children in northern Vancouver, British Columbia. Starr (1903) examined all of the seven babies of a Maya Indian village in Central America, and found on all of them a bluish, or bluish-purple spot, limited to the sacral region and disappearing by the tenth month. Three half-breeds did not show it. Lehmann-Nitsche (1904 and 1905) reports his observations on Araucanian Indians in Argentina. He found a pigment spot as large as a hand in the sacral region, extending to the gluteal and lumbar regions, with occasionally an accessory spot. He considers the term violet, or mulberry-colored, as most distinctive, and states that the color did not differ strikingly from the rest of the body color. No definite observations are reported, to my knowledge, on Indians of the United States.

Among half-breeds, such as Chino-Japanese, Chino-Malays, and others, where both races have it normally, the spot is found.

Among Euro-Japanese, Aino-Japanese, and other mixtures of dark and white races, the spot nearly always occurs, but is fainter, less extensive, and disappears earlier (Grimm). If the child strongly resembles the white parent the spot is more apt to be absent than in the darker children. Among Euro-Javanese Baumgarten found it in 90 percent of cases.

From Africa we have no very definite reports. Adachi refers

to Pruner Bey, Schweinfurth, and von Helmhold, who noted in newly-born African children grayish or slate-colored spots in various regions of the body. Although no statements are made as to definite localities, there seems little doubt, after my own observations, that what they saw was our pigment spots. R. M. speaks of their occurrence among the Negritos of the Philippine islands, Riedel among the Papuans, and Chemin reports an observation in Madagascar. Baelz speaks of their occurrence among mulattos of Brazil. Lehmann-Nitsche (1904-05) examined critically half a dozen negro half-breeds of Argentina between six months and two and a half years of age. He found a sacral spot as large as a hand, violet, gray, or slate-colored, not blue as in the Japanese, and not strikingly different from the rest of the body color. He does not report its presence in other parts of the body. Among these people the spot is known as *la mancha morada* (violet or mulberry-colored spot), and the author suggests the adoption of this term by Spanish writers. Wardle (1902) points out the opportunity for study of this subject in this country and regrets that no one has seized it.

There is no record of microscopical examination of such spots in negro children. Frederick (1905) records an exhaustive study in Schwalbe's laboratory of the skin of a four-months colored child. He refers to Adachi's work, but apparently made no observation on the pigment spots.

Ashmead, of New York, at one time foreign medical director of the Tokio Hospital, Japan, in a recent compilation (1905) defends the strange thesis that the presence of this spot always means negro descent! He contributes no new facts or observations.

During the last few months I have carefully examined 40 colored children under one year of age with reference to the occurrence and distribution of these pigmented areas. The American negro of whom one can say with assurance that he has no white blood is rare. One must think of practically all of these babies then as of mixed white and black blood—in no case, however, of this generation, but always going back at least two or three generations. The color varied from that of a white baby to that of an adult negro, from white through light brown to black. In only two cases was there any other known admixture; in these there was some Indian blood.

About one-half of these cases were less than one week old. There seems still much uncertainty as to the degree of color in the newly-born negro child. Adachi (1903), for example, says: "One finds everywhere mentioned that the newly-born negro enters the world with the same white skin that the European does. And yet not rarely travelers speak of faintly-colored newborn children of the black race." A colored child of very light parents may be indistinguishable at birth, so far as color is concerned, from a white child, but the ordinary colored child enters the world noticeably pigmented, and many are very black from the start. The color deepens for some years, especially in those born very light. The deepest black of the adult full blood, however, one rarely, if ever, sees in the newly born.

Of the 40 cases, 35 showed well-marked areas of bluish pigmentation at the time of examination. In one other child of nine months nothing could be made out any longer with certainty. Shortly after birth, however, there was a deep blue sacral spot as large as a hand that has disappeared only in the last few months.

Two other babies of seven and nine months respectively did not show the spot, and the mothers stated that it never had been present. In these two cases it may easily have been overlooked earlier. Another child was seen only during the first two weeks. It was very light and may have developed the characteristic spot later, although I have never seen a case in which the spot appeared after birth. One other baby I saw a few days after birth and again at four months. This child and both parents were very light brown. The child was darker at the last examination, but no spot was present at any time. All of these four children were very light except one, nine months old, who was very dark. I think one may safely assume that in this last case the spot was present earlier and that if any was left it was covered by a heavy black epidermal layer of pigment. The spot was seen in 90 percent of cases and probably occurs in at least 95 percent of ordinary colored children before they reach the second year.

In the remaining 35 cases there was always a distinct area, usually of maximum intensity, at the very point where the rima glutea widens out on the sacrum. This area varied in size from that of a

dime to that of a dollar, showed no special symmetry, and was not abruptly defined. In 24 cases similar areas were found on the buttocks; in 19, in the lumbar region; in 8, on the back, shoulders, and extensor surfaces of the legs and feet; in 4, on the extensor surfaces of the arms and hands — only once on a flexor surface — never on the ventral surface nor on the head or neck.

The color varied from a dull bluish-gray, or slate color, to a distinct dull deep blue, or violet, or plum color. Lehmann-Nitsche, it will be remembered, found the color in mulattoes of Argentina "violet gray or slate-colored, not blue as in the Japanese" and "little distinct from the rest of the body." The personal equation enters very much into finer determination of shades of color. I have seen well-marked Mongolian spots on two Chinese babies and was impressed by their resemblance in every way to those found in brownish colored babies. The contrast of blue and brown differed but little in intensity, it seemed to me, from that of the Mongolian. In darker and older babies a dark slate-blue often merges imperceptibly into the surrounding black.

Four or five of the cases had peculiar spots that appeared *sui generis*. The latter were always round, sharply defined, about one-half to one centimeter in diameter, deeply blue, looking exactly like tattoo marks. They were all in the gluteal or lumbar region, except in one case where there was one on one shoulder and two on the other.

I will describe a few cases in detail to convey a more definite idea of what these areas are like in the colored child.

1. Baby W., a typical case. $\text{\textit{A\textit{et}}}.$ 5 months. One grandparent on each side white. Child was "almost white" at birth — considerably darker now. Small irregular area of distinctly bluish discoloration at upper end of rima glutea more or less continuous with a bluish spot the size of a half-dollar over the right, and two each the size of a quarter over the left, buttock. Slight bluish discoloration over the lower portion of the lumbar region. More marked at birth than now. Began to get darker two weeks after birth; increased in intensity till about one month ago. Then "real blue" according to the mother. Since then fading rapidly and child getting darker. When seen one month later all of the spots were much paler.

In many cases only a sacral spot was found. In others the distribution was so widespread that I believe one is justified in thinking that there are colored babies whose general color effect at a given time is bluish- or violet-black rather than black or brown; *i. e.*, cases in which deep corium pigment — if we may assume its causal relationship — exceeds, or at least equals, that of the epidermis. I will cite two additional cases that illustrate this point.

2. Baby B. $\text{\textcircumflex} \text{Et}$. 8 months. Medium brown color. Mother and father moderately dark brown. Great grandfather white. Dark blue wedge-shaped spot at upper end of rima glutea; raphe and adjacent sides dark blue. Fairly well marked over inner side of right buttock; at upper end of same a small, round, sharply-defined spot 1 cm. in diameter, deep blue like a tattoo mark. Greater part of the left buttock discolored bluish; maximum at middle. Few small bluish spots in the lumbar region and on the back. One just back of the *ant. sup. sp.* of the ilium: pale blue, size of a dollar. Broad transverse band of bluish discoloration across the upper part of the back and over the left shoulder. Few small spots on the extensor surfaces of left upper and fore arm. Faint spot on dorsum of left hand. Bluish discoloration over right deltoid and on dorsum of right hand. Four well-marked spots each the size of a cent on extensor surface of left leg, ankle, and foot. Eight to ten spots a few millimeters in diameter on upper extensor and lateral surface of left thigh. Bluish area in front of the right ankle the size of a dollar. I examined this child four months later. All spots were very much paler or had disappeared. The bluish pigmentation was doubtless more intense prior to my first examination.

3. Baby H. $\text{\textcircumflex} \text{Et}$. three and one-half months. Medium brown; parents same. Grandfather white. Deep blue spot at lower end of sacrum, size of silver half-dollar. A number of small paler spots over buttocks and lumbar region. Area of pale blue along left side extending from near axilla to costal border and toward the spine, about two by four inches in extent. Similar spot on right side nearly as extensive. Round spot 1 cm. in diameter on left shoulder, like heavy tattoo mark. On left shoulder a similar spot 1 by 2 cm. in area, and back of the right clavicle another 2 mm. in diameter.

A very distinct, sharply-defined, pale blue area in front of the left knee and tibia, the size of a dollar. A narrow bluish band entirely around the right ankle, *i. e.*, also on the flexor surface. Many other portions of the body gave one the impression of a bluish tint. The mother did not know whether there had been much change since birth or not. An older brother had convulsions and was deeply cyanotic before this baby's birth. The mother thought that the present baby was "marked" by her seeing her blue baby.

It was impossible to establish any definite relationship between the intensity of these spots and the amount of white blood in any given case, because of the uncertainty concerning ancestors more than one or two generations removed. I think it is probable that the actual amount of pigmentation is greater in black children, while as a matter of fact it usually appears more conspicuous in lighter brown children. Black very easily obscures dull blue, while brown presents a favorable contrast. On the whole the degree of pigmentation of these spots and its extent vary so widely in different cases that one can predict nothing definitely from the degree of general pigmentation.

I have examined a great many older colored children but have not tabulated my results. After the first or second year it becomes impossible to decide in the great majority of cases whether a spot is still present, hence statistics would have no value. By this time the areas have become faint or absent, and the dark epidermal pigment has covered the remnant. I have never seen a spot well-marked after the third or fourth year.

Sections from the skin of the sacrum of a moderately-pigmented still-born negro child were examined microscopically. The child was apparently normal in every way, death having been due to strangulation by the cord wound about the neck. The mother was black, the father was said to be much lighter; both probably had some white blood. No blue spot could be made out, but the child had been dead 24 hours when examined. Postmortem discoloration and probably opacity of the superlying skin would naturally obscure such spots. From the degree of general pigmentation of both mother and child I feel certain that a well-marked pigment spot would have been present if the child had been born alive.

Two pieces of skin were examined — one from the median line at the lower end of the sacrum, in which place it will be remembered the spot was always found if present at all ; the other from the less-pigmented ventral surface of the chest near the axilla.

The skin from the chest was thin ; the epidermis showed well-marked brownish granular pigmentation in the deeper layers. *No pigment could be found in the corium.*

The sacral skin was much thicker. The epidermis contained the same brown granular pigment in the usual location, but in greater amount than in the other sections. The upper part of the corium was apparently wholly free from pigment cells for a depth varying from one, more commonly two, to three times the thickness of the epidermis. The remainder of the corium, from four to six times the thickness of the epidermis, was thickly strewn with large pigment cells that formed a very striking picture in unstained sections under the low power of the microscope. These cells were for the greater part spindle-shaped ; frequently, however, they were stellate or branched, or irregular in shape. In many of them distinct oval nuclei could be seen. The rest of the cell was packed with rather coarse brown pigment granules, of the same tint as the epidermal pigment. In many places one could see only irregular masses of these granules, probably due to a tangential section of a cell. The cells were large, commonly from three to ten times the length of the ordinary connective tissue nucleus. Their long axes were usually parallel with the connective tissue fibers. With a No. 6 Leitz objective as many as 15 to 20 of them could often be found in one field in sections $20\ \mu$ thick. (See plate 1.)

So closely do these cells resemble in every way those described by Baelz, Grimm, Adachi, and Birkner, in Japanese, Chinese, and Caucasian children, that no doubt can remain as to their identity. This demonstration of these cells in another race in which the blue pigment spot is so prominent a feature still more firmly establishes their causal relationship to these peculiar areas of pigmentation.

Adachi's conclusion that these pigment spots are found in all races of mankind still required verification by demonstration on a pure Caucasian child. Sekiba, in a letter to Adachi, stated that he found the pigmentation present sixteen times in one hundred and



FIG. 1.—Microphotograph of unstained section ($20\ \mu$) of skin from the lower sacral region of a stillborn negro child. The epidermis shows the usual pigmentation of the Stratum Malpighii. The upper third of the dermis is wholly free from pigment. The lower two-thirds are dotted with the large, dark, spindle-shaped pigment cells that cause the blue "sacral spot."

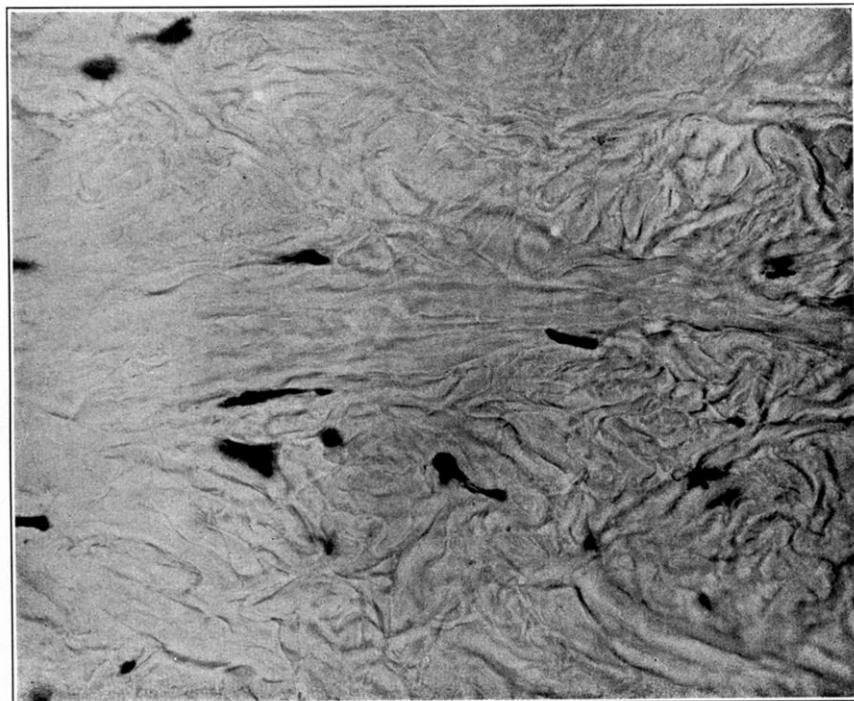


FIG. 2.—Same as Figure 1, more highly magnified (about 600 diam.). Sections unstained, $20\ \mu$ thick. The large pigment cells show as black irregular masses embedded in the connective tissue of the dermis.

fifty children of pure Ainos, a primitive, nearly extinct white race of northern Japan. Grimm, Koganei, and others denied its presence in this white race, but their observations were very limited. Baumgarten, in a letter quoted by ten Kate, says: "In Europeans of pure blood, too, this spot occurs, but rarely." Tsuboi, in a personal communication to Adachi, said that it occurs in Europeans during embryonic life, but that it disappears before birth. This view has had no confirmation and is distinctly opposed by Adachi's findings.

The first well-authenticated case in a European child was reported by Adachi himself and a Japanese co-laborer, Fujisawa, in the same number of the *Zeitschrift für Morphologie und Anthropologie*, in which his main work appeared. After examining fifty children in Seitz's clinic at Munich, Fujisawa found one of apparently pure Caucasian lineage who had two faint but distinct bluish spots. Nothing was noticed at birth, but a week later the grandmother observed on the right buttock a small round bluish or slate-blue spot. A week later she found on the same buttock and partly concealed in the rima glutea another one as large as a thumb. Fujisawa reported the same case two years later (1905) in greater detail. The spots were still present but much paler. A second child born to the same parents had three distinct bluish spots with the same characteristics as those of the older child. One naturally thinks of a possible contamination by a dark race. Epstein of Prag (1906) refers to the historical fact that in the thirteenth century Mongolian hordes penetrated as far west as Olmuetz in Maehren. The father's people came from this region. One might attribute these spots, then, to a recurrence of a remote ancestral characteristic, or to a persistence, in spite of very great dilution, of a tenacious race characteristic. The occurrence of two cases in the same family would seem to add weight to this theory.

If this objection to Fujisawa's cases leaves doubt as to the occurrence of the *Mongolen Fleck* in pure white children, the further report of Epstein (1906) should remove any doubt from the mind of an unprejudiced person. He describes five cases that he has seen in the last two years and estimates the total number of cases that he has seen in the last twenty years at twenty-five. In his

earlier cases he was at a loss to explain them. All of the five reported cases were children under fifteen days old, except one who was ten months old. The latter was seen again at two and one-half years. The large, well-marked blue or blue-gray spots were still visible, but smaller and paler. The spots in these white children apparently differed in no essential way from those found in darker races. The color was bluish, or bluish-gray, and in every case they were found in the sacro-lumbo-gluteal region. Epstein estimates their frequency in white children at about one in six hundred.

With the report of these well-authenticated cases from a country where racial contamination may be excluded with considerable certainty, there seems little doubt that the *Mongolen Fleck* of Baelz is found also in the white race and so in all races of mankind. The constancy with which we find the identical characteristics of location; time of occurrence, duration, and color (always blue, or bluish, or violet), seems to leave no doubt that in all these cases we are dealing with the same morphological entity, although the causal pigment cells of Baelz and Grimm have been demonstrated in only a few races.

What significance shall we attach to this peculiar phenomenon, and how interpret it biologically? A characteristic so striking is sure to find many explanations and to give rise to many superstitions. Among the common people of Japan it has been considered a result of coitus during pregnancy (Adachi), or as a mark made by the god Kami-Sama who presides over births. Japanese writers have offered many solutions. In the seventeenth century Soha Hatona, and his sons after him, applied a paste to the spots to purify the blood. Siguen Kagawa (1765) believed that the obi, or common belt, of the Japanese women, decomposed the blood of the mother, and this, stagnating, affected that part of the child lying closest to the abdominal wall, *i. e.*, the sacral region. Ransai Kagawa, a great obstetrician, more than a hundred years ago thought that it was due to contact of that part of the fetal body with the placenta. Hisao Yamada (1851) and Ritsuen Asado (1870) held the same view. Shiusei Omaki (1826) attributed its presence to the hot food taken by Chinese and Japanese mothers, the heat descending through the mother, decomposing the blood, and caus-

ing it to settle in the most dependent part of the fetus, the sacral region, or the shoulders and back, depending on the position of the fetus. Shinsai (1846) thought it due to coitus during pregnancy, the heat of the semen decomposing the blood of adjacent portions of the child in such a way that contact with the air caused it to turn blue.

Among Samoans the spot under consideration is considered a sign of Samoan origin. Half-breed Indians of Brazil call it *genipapo* because of its resemblance to the bluish-gray color of an indigenous fruit. *Tem genipapo* means "he has Indian blood." Brazilians state that the spot has a marked tendency to persist in half-breeds even if no new Indian blood enters in. Some pious Brazilians think of it as the "seal of Cain." Among Hawaiians the spot is called *he ila*, and the common people think it is due to the pregnant mother eating the fruit of a plant called *popolo*, which has a dark violet color when crushed. Among the Maya Indians it is called *uits* or *pan* (bread), and it is an insult to speak of it (Starr). Araucania mothers know of its occurrence but attach no significance to it (Lehmann-Nitsche). In parts of Argentina, as above mentioned, the spot is called *la mancha morada*, or simply *la mancha* (Lehmann-Nitsche), and it is considered merely a sign of African blood. It often persists here, it is said, for a long time, even to adult life, and such expressions as "he has the mancha morada," or "he has the violet tail," or "he has the spot on the tail," are used to designate a man as mulatto, or to insult or offend him.

An interesting observation is reported by the same author in *Globus* (1905) from Santiago del Estero, Argentina. The spot is here considered pathological, and the child's foot is therefore pressed against the bark of a certain kind of tree and its outline cut with a knife. The bark is then lifted out. When this defect heals over the spot will have disappeared!

I have questioned nearly all colored mothers whose babies I have examined to see what view they took of the spot. I have been unable to find any evidence of superstition regarding its presence. A considerable proportion of them had never noticed it—had never heard of it—even many whose children were well marked. Others knew that their babies had a bluish mark, that it was the

rule for colored children to have such marks, and they looked on it as they would on other negro characteristics. As one mother put it: "They say it shows that a person is a real negro." I was surprised to find a number who considered these spots as birth-marks peculiar to their children. One very intelligent mother was watching with the keenest satisfaction the disappearance of this peculiar "birth-mark"—she had never discussed it with anyone and so did not know of its general occurrence. Still another, whose baby had a large dark bluish-purple spot, thought her baby "marked by a plum"! Many of them were very much amused at my interest in these spots, but none seemed to have the slightest reticence about speaking of them.

Among men of science an idea was current, before Adachi's work was published, that perhaps these spots were a storehouse for pigment to be used as needed. Wardle (1902) states such a view as follows:

May not these evanescent congenital pigmented areas be regarded as the nuclei of more general pigmentation, the regions wherein occurs the first deposition of the cutaneous pigment normal to the darker races and peoples, and is their apparent disappearance not to be explained by the deepening of the tint of the whole body surface?

Ashmead (1905) gives as strange and unique an interpretation for one who is familiar with Adachi's work, as is his whole theory that ". . . wherever you find black blood contaminating white there you will find the mulberry spot of Japan"—and, by inference, nowhere else! I quote his view without further comment:

For myself, I believe that there is furnished to the offspring in utero, by the negro or negroid parent, too much pigment in the blood which must circulate through the placenta and the child during gestation. The excess settles in the part least developed, of least resistance in development or underdevelopment, where another member once had been formed in distant ancestry; it is therefore of rudimentary growth. The child of such parentage cannot get rid of its excess before birth, in the shape of meconium or otherwise. The tendency in colored races is to the skin outwards, and not inwards. Thus metabolism is insufficient to rid the system of what was necessary to human creation thousands of years before the white man appeared.

Epstein (1906) still considers the phenomenon here dealt with a valuable Mongolian race characteristic, and thinks it "justifiable to

look upon the blue spots occurring exceptionally in the sacral and neighboring regions of white children as abnormal phenomena that are probably to be attributed to pathological factors in fetal development." If this spot has been found in practically all other races of mankind it is difficult to see why we should hesitate to acknowledge its morphologically identical nature in the white race when Adachi has demonstrated there in the same region, and at the same time, in the same portion of the corium, apparently the same pigment cells that cause the spot in darker races.

The view held by Adachi that we have here to deal with a rudimentary formation can alone, it seems to me, explain satisfactorily these strange spots. In monkeys epidermal and dermal pigments are formed independently and have presumably the same function. Either one or the other may be the more prominent in any locality, *which* being dependent on the species. In man epidermal pigment alone plays an important part. It too is formed independently of that in the corium. In the latter the superficial widely-distributed layer is very insignificant. The deeper-lying pigment cells of the corium still persist in man as a localized transitory condition, limited normally to the latter part of intrauterine life and the first few years of infancy and childhood. In darker races, where there is more pigment in general, these cells are still sufficiently abundant to appear as the bluish spots of the sacro-lumbo-gluteal region and of other localities where pigmentation is normally deep—persisting for a variable time, in isolated cases only, to adult life. In the race of least pigmentation, the Caucasian, the same pigment cells are present, under nearly identical circumstances, in nearly one-half of all children under two and a quarter years of age (Adachi)—probably a larger percentage of cases would be found if each one could be examined in all stages of its development. Very exceptionally do they occur in sufficient numbers or sufficiently concentrated to be visible as our blue spot.

We must think then of this pigmentation as a normal human characteristic, not a recurrence of a *lost* ancestral condition, *i. e.*, atavism, as suggested by Bloch, but the *persistence* in rudimentary form of what was once perhaps a more widespread and functional layer of pigment such as exists in certain monkeys.

It is interesting in this connection that in the higher or anthropoid apes there is a tendency to predominance of epidermal over corium pigmentation. One cannot, however, classify monkeys systematically on this basis. Neither can one reason that the greater prominence of sacral spots—*i. e.*, deep corium pigmentation—places the darker races nearer the common ancestor of man and monkey. Degree of pigmentation is determined by other factors, and the intensity of these spots is rather directly proportional to the degree of general pigmentation of the race and of the individual. Even in the white race both spots and cells have been found almost exclusively in dark individuals.

The occurrence at a certain stage only of early development is in accordance with our knowledge of many such vestigial structures. I need only mention lanugo hairs, the cauda humana, gill slits, etc. These corium cells would naturally appear at about the same time that the permanent epidermal pigment does. For a time both increase in intensity—then one gradually fades away. So in the Japanese our pigment cells are found at the middle of intrauterine life—in the Caucasian, after birth.

Why this remnant should favor the sacral and adjoining regions, when there is no such tendency in monkeys, for example, has not been explained. We are no nearer to a real solution when we suggest a possible connection with a primitive tail, or with a relatively late differentiation of the posterior end of the body which makes it *sui generis*, as shown, for example, by the comparatively frequent occurrence of pathological conditions and anomalies peculiar to this region. The frequent occurrence of these spots in other favored locations, such as the shoulders, the back, the extensor surfaces of the extremities—in nearly one-half of my cases—would lead us to think of possible vestigial deep pigmentation in any location where epidermal pigment is normally most abundant, following a general law in both man and monkeys that epidermal and corium pigment is found more or less in the same proportion (Adachi). We know, too, that as a general law corium pigment is more abundant on the trunk than on the extremities (Adachi). One naturally thinks of a possible persistent ancestral tendency to deeper pigmentation in the sacral and adjoining regions, as for example in certain

baboons, notably the mandrill, although at present there is no further evidence to support this view.

We can no longer consider these spots as exclusive race characteristics. They are to be accorded the same value as other racial traits—color, hair, features, etc. Their presence or absence in given cases leads to highly probable but not positive determination as to race or to degree of contamination. This is of especial interest to us in this country.

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